4-Hydroxyanisole CAS No.: 150-76-5
Background Information, Test Plan, and Robust Summaries

Introduction

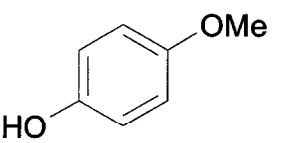
This test plan is provided by the American Chemistry Council HQMME Task Force of the HQPD Panel in fulfillment of its commitment under the US HPV Chemical Challenge Program. Members of the HQMME Task Force are Rhodia, Inc., Eastman Chemical Company, Borregaard, and Specialtychem Products Corporation.

Summary

4-Hydroxyanisole has been manufactured in the US and abroad for many years. It is used primarily in industrial settings as an oxygen scavenger for polymerization inhibition in the manufacture of a broad array of products. Non-industrial applications for this material are believed very minor. The amount used for pharmaceutical needs--including use as an active ingredient in a prescription dermatological product–is unknown to the member companies submitting this test plan; member companies do not produce drug-grade product and the amount used is most likely very small relative to industrial applications. As shown in the Test Plan, the Physical/Chemical Properties, Environmental Fate and Effects, and Mammalian Toxicity associated with 4-hydroxyanisole are well characterized. No further testing has been proposed for this material. Robust summaries are provided as Appendix A.

Chemical Identity:

4-Hydroxyanisole
CAS No.: 150-76-5



Background Information: Manufacturing and Commercial Applications

Manufacturing

4-Hydroxyanisole is made in batch processes using hydroquinone, sodium hydroxide and methyl chloride as the primary starting materials. This reaction produces crude 4-hydroxyanisole and a minor co-product 1,4-dimethoxybenzene. The crude 4-hydroxyanisole is distilled to remove trace impurities.

Commercial Applications

4-Hydroxyanisole has been manufactured in the United States for nearly 40 years and is widely used throughout the chemical industry due to its excellent stability and functionality as an oxygen scavenger. The majority of all usage is in industrial applications as a polymerization inhibitor for acrylic acid and esters, acrylonitrile and methacrylic acid and esters. It is also utilized as the starting material for the production of butylated hydroxyanisole. A very minor application that has only just recently been developed is as an active ingredient in a dermatological preparation used to lighten skin. The safety of the product for this consumer use was reviewed by the FDA and included data not completely accessible to the Panel.

Shipping/Distribution

4-Hydroxyanisole is shipped extensively throughout the world from manufacturing plants located in the United States, Western Europe, Japan and India.

Worker Exposure

The synthetic fine organic batch manufacturing industry has a long safety record and sophisticated industrial users handle this material. Exposure of workers to 4-hydroxyanisole is likely highest in the area of material solidification and packaging rather than from chemical manufacturing. This material is made as a molten material that is usually flaked or cast and then re-melted or dissolved at the user's facility. As there is little dust generation with the use of this material, the main exposure is from vapor generated in the hot liquid operations as it is solidified and packaged. This is controlled by any number of air control technology applications and good industrial hygiene practices by workers. There is a TWA exposure level of 5 mg/m^3 set by the ACGIH and by NIOSH. Appendix B provides additional information about industrial hygiene during manufacture of HQMME at one example facility.

Consumer exposure

Consumer exposure is minimal except through its use as an active agent in a dermatological product recently approved by the US FDA. This product is listed by the FDA as being available for use by prescription only. The product is applied directly to the skin in a cream/ointment form.

HQMME Test Plan

As shown in the Test Plan below, the Physical/Chemical properties, Environmental Fate and Effects, and Mammalian Toxicity associated with 4-hydroxyanisole are well characterized. No further testing has been proposed for this material.

In preparing this test plan, the Hydroquinone Precursors and Derivatives Panel has given careful consideration to the principles contained in the letter the EPA sent to all HPV Challenge Program participants on October 14, 1999. As directed by EPA in that letter, the Panel has sought to maximize the use of existing data. Additionally, and also as directed in EPA's letter, in analyzing the adequacy of existing data, the Panel has conducted a thoughtful, qualitative analysis rather than use a rote checklist approach. It is the intent of the Panel to fulfill all the Screening Information Data Set (SIDS) endpoints of the HPV program through the use of data that are already in existence.

Physical-Chemical				
Melting Point	**Boiling Point**	**Vapor Pressure**	**Partition Coefficient**	**Water Solubility**
A	A	Calc	A	A

Environmental Fate			
Photodegradation	**Stability in Water**	**Transport/ Distribution**	**Biodegradation**
Calc	NA	Calc	A

Ecotoxicity		
Acute Toxicity to Fish	**Acute Toxicity to Aquatic Plants (e.g., Algae)**	**Acute Toxicity to Aquatic Invertebrates (e.g., Daphnia)**
A	A	A

Mammalian Toxicity					
Acute Toxicity	**Bacterial Genetic Toxicity *In Vitro***	**Mammalian Genetic Toxicity *In Vitro***	**Repeat Dose Toxicity**	**Reproductive Toxicity**	**Developmental Toxicity**
A	A	A	A	A	A

Legend	
Symbol	**Description**
Test	Endpoint requirements to be fulfilled with testing
Calc	Endpoint requirement fulfilled based on calculated data
A	Endpoint requirement fulfilled with adequate existing data
NR	Not required per the OECD SIDS guidance
NA	Not applicable due to physical/chemical properties